

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested.

Claims 1-25 are pending in this case. Claims 6-12 and 14-17 are withdrawn. Claims 2, 3, and 13-15 are amended and new Claims 19-25 are added by the present amendment. Amended Claims 2, 3, and 13-15 and new Claims 19-25 are supported by the original claims. No new matter is added.

In the outstanding Office Action, the drawings are objected to as containing informalities. Claims 2, 3, and 13 were rejected under 35 U.S.C. §112, second paragraph, as indefinite. Claims 1, 2, 4, 5, 13, and 18 were rejected under 35 U.S.C. §102(e) as anticipated by Trindade (U.S. Patent No. 6,643,103). However, Claim 3 was objected to as being dependent on a rejected base claim, but otherwise were indicated as including allowable subject matter if re-written to overcome the rejection under 35 U.S.C. §112, second paragraph, and in independent form.

Applicants gratefully acknowledge the indication that Claim 3 includes allowable subject matter.

In response to the objection to the drawings, six replacement drawing sheets are submitted herewith. Figures 2A and 2B are amended to include the legend "Prior Art," the y-axis label "Output," and the x-axis label "Time." Figures 3B and 9 are amended to correct the labeling of the coordinate axes. Figure 8 is amended to include the y-axis label "Output" and the x-axis label "Time." Figures 10 and 12 are amended to change the designations "45a, 45b" and "47a, 47b" to "44a, 44b" and "48a, 48b," respectively. Figure 14 has been amended to change the reference numeral "23" on the left side of the figure to "25." The amended drawings are supported by the original drawings and specification. No new matter

has been added. Accordingly, the objection to the drawings is believed to have been overcome.

With regard to the rejection of Claims 2, 3, and 13 under 35 U.S.C. §112, second paragraph, Claim 2 has been amended to clarify that a first magnetic shield is arranged on an opposite side of the first electrode from the underlayer and a second magnetic shield is arranged on an opposite side of the second electrode from the protective layer. Claim 3 is amended to depend from Claim 2, providing the phrase “the magnetic shields” in Claim 3 with antecedent basis. Claim 13 has been amended to clarify that the hard biasing films impart magnetic biases rather than anisotropies to the first and second magnetization free layers. Claim 13 has also been amended to clarify that a hard biasing film is arranged on each end of the magnetoresistive film in a track width direction. Accordingly, applicants submit Claims 2, 3, and 13 are in full compliance with all requirements under 35 U.S.C. §112, second paragraph.

With regard to the rejection of Claims 1, 2, 4, 5, 13, and 18 under 35 U.S.C. §102(e) as anticipated by Trindade, Applicants respectfully traverse the rejection.

Claim 1 recites a magnetoresistive head comprising, *inter alia*:

a magnetoresistive film including first and second magnetization free layers, an intermediate layer sandwiched between the first and second magnetization free layers, ... wherein first and second magnetization free layers produce a magnetoresistance effect in accordance with the magnetization directions thereof ...

Trindade discloses a current-perpendicular-to-plane (CPP) differential dual spin valve head including two spin valves 238 and 242.<sup>1</sup> Specifically, spin valve 238 includes first exchange layer 222, first pinned layer 224, first spacer layer 226 and first free layer 228. Second spin valve 242 includes second free layer 230, second spacer layer 232, second pinned layer 234 and second exchange layer 236. Spin valves 238 and 242 have free layers

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<sup>1</sup>See Trindade at column 5, lines 3-15.

228 and 230, respectively, located in the center of the multilayer structure and spaced apart by metallic middle layer 240. The metallic interlayer physically defines the intrinsic linear resolution of head 220.<sup>2</sup> This “dual spin valve head” corresponds to the “head” of FIG. 1B described as prior art in the specification of the present application.

The separate spin valves of the dual spin valve head disclosed in Trindade are configured to operate independently. Figures 8B and 8C show that the two spin valves 238 and 242 independently generate a magnetoresistive effect. The magnetoresistive changes are determined separately for each head, as shown in Figures 8A, 8B, 8C, and 9B of Trindade. The term  $\Delta R1$  corresponds to the change in resistance of the first spin valve ( $R_{SV1}$ ) due to a magnetoresistive effect and  $\Delta R2$  corresponds to a change in resistance of the second spin valve ( $R_{SV2}$ ) due to a magnetoresistive effect.<sup>3</sup>

In fact, any interaction between the valves degrades performance of the apparatus. “Differential operation is optimized by minimizing interlayer coupling and GMR effect between free layers 228 and 230, and by matching the GMR ratio of spin valves 238 and 242.”<sup>4</sup> Thus, Applicants respectfully submit that Trindade does not teach a magnetoresistive film including first and second magnetization free layers, an intermediate layer sandwiched between the first and second magnetization free layers, wherein first and second magnetization free layers produce a magnetoresistance effect in accordance with the magnetization directions thereof, as recited in Claim 1.

Since Trindade does not teach each and every element of Claim 1, applicants respectfully submit that Claim 1 is not anticipated by Trindade, and is patentable thereover.

Claims 2-5, 13, and 18 are dependent, directly or indirectly, from Claim 1. Thus, it is respectfully submitted that Claims 2-5, 13, and 18 are also patentable over Trindade.

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<sup>2</sup>Trindade, column 5, lines 6-15.

<sup>3</sup>See Trindade at column 6, lines 39-59, and Figures 8A, 8B, 8C, and 9B.

<sup>4</sup>Trindade, column 6, lines 32-35.

New independent Claim 19 recites similar elements to Claim 1. Applicants respectfully submit that Claim 19 is patentable over Trindade for the reasons discussed above with respect to Claim 1.

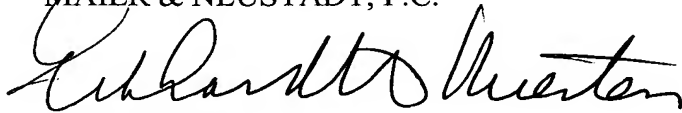
New Claims 20-25 are dependent, directly or indirectly, from Claim 19. Thus, it is respectfully submitted that new Claims 20-25 are also patentable over Trindade.

Applicants respectfully request that withdrawn Claims 6-12 and 14-17 be reinstated and allowed, as generic Claim 1, from which Claims 6-12 and 14-17 depend, is believed to be patentable.

Accordingly, the outstanding rejection is traversed and the pending claims are believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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